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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09 839,365	04 23 2001	Chien-Li Kuo	REF/KUO.882CIP	2321

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EXAMINER

CHEN, KIN CHAN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 07/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/839,365

Applicant(s)

KUO ET AL.

Examiner

Kin-Chan Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 14 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1,3-11,13-18 and 20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-11,13-18 and 20 is/are rejected.
- 7) ☒ Claim(s) 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. The final rejection (Paper No. 9, filed January 14, 2003) is withdrawn. The non-final rejection follows.

Claim Objections

2. Claim 20 is objected to because of the following informalities:

In line 3, before "over", "a" should read --an--.

In line 4, before "coating layer", "cover" should read "over".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. Claim 20 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for forming the contact window, does not reasonably provide enablement for how the contact hole is formed due^{to} the effect of viscosity. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to carry out the invention commensurate in scope with the claim.

The specification must teach those skilled in the art how to make and use the full scope of the claimed invention without "undue experimentation". *In re Wright*, 999 F.2d 1557, 1561, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993).

4. Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 20 recites the limitation "said contact window" in line 6. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1 and 3-11 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Akram et al. (US 5,849,635; hereinafter "Akram").

Akram teaches a method for forming a contact window. A plurality of semiconductor structures may be formed on a wafer. A plurality of gaps are located between neighboring semiconductor structures. A coating layer may be formed over the surface of the wafer. The thickness is not less than the heights of the semiconductor structures. The semiconductor structures are covered by the coating layer and the gaps are totally filled by the coating layer. An over-coating layer is formed over the coating layer. The gaps are not filled by over-coating layer. The contact window in both the over coating layer and the coating layer may be formed wherein upper part of the contact window is outwardly widened. Akram also teaches the limitations of above-cited dependent claims. See col. 1, lines 12-20; col. 3, line 38-col.4, line 19; col. 5, lines 1-50.

Akram teaches over-coating layer with various etching rates. Akram does not disclose the etching rate of the coating layer. However, Fig. 5 shows that after etching, the contact window is outwardly widened. Therefore, inherently, the etching rate of the over coating layer is higher than the etching rate of the coating layer.

8. Claims 13-18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akram et al. (US 5,849,635; hereinafter "Akram").

Akram teaches a method for forming a metal plug. A plurality of semiconductor structures may be formed on a wafer. A dielectric layer may be formed over a wafer. The surface of the dielectric layer may be planarized. An oxide layer may be formed over the dielectric layer. The contact window in both the oxide layer and the dielectric layer may be formed wherein upper part of the contact window is outwardly widened. A metal is filled in the contact window. Akram also teaches the limitations of above-cited dependent claims. See col. 1, lines 12-20; col. 3, line 38-col.4, line 19; col. 5, lines 1-50.

Akram teaches oxide layer with various etching rates. Akram does not disclose the etching rate of the dielectric layer. However, Fig. 5 shows that after etching, the contact window is outwardly widened. Therefore, inherently, the etching rate of the oxide layer is higher than the etching rate of the dielectric layer.

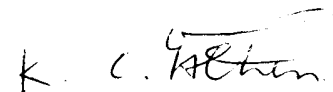
The above-cited claims differ from the prior art by specifying well-known features (such as planarizing the dielectric layer by a chemical mechanical polishing in claim 13; using annealing oxide layer in claim 18) to the art of semiconductor device fabrication. A person having ordinary skill in the art would have found it obvious to modify Akram by adding any of same well-known features to same in order to provide their art recognized advantages and produce an expected result.

As to claim 20, Akram teaches a method for forming a hole. A coating layer may be formed over the surface of the wafer. An over-coating layer is formed over the coating layer. The hole in both the over-coating layer and the coating layer may be formed wherein upper part of the hole is outwardly widened. See col. 1, lines 12-20; col. 3, line 38-col.4, line 19; col. 5, lines 1-50. Akram does not disclose the viscosities of

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over-coating layer and the coating layer. However, Fig. 5 shows that after etching, the contact window is outwardly widened. Therefore, inherently, the viscosity of the over-coating layer is higher than the coating of the dielectric layer.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (703) 305-0222. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2934.



Kin-Chan Chen
Primary Examiner
Art Unit 1765

K-C C
July 8, 2003